Sum of the Parts: 
Leveraging BIM to Achieve Effective 
Delivery of Mass Customised Housing

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ABSTRACT

The UK housing market has, over the recent 5 years, experienced considerable economic pressures both from the market place and the construction sector. The need for an economic and mass produced housing type that specifically targets the market to achieve the balance for the need of affordability and the benefits of mass customisation is a key focus for delivery. This study sought to deliver a mass produced housing system that could also deliver a high level of customisation. Historically housing that has been mass produced to ensure affordability, has removed a high level of customisation to ensure that the final costs were controlled. This paper also examines the design factors that are integral to the process of delivery of affordable housing. In addition, it will observe the gaps between affordability and mass customisation of a modern method of construction delivered project and the move away from traditional methods of delivery, mapping the shift in the procurement of the design for such housing typologies.

Keywords: Architecture, Low-Cost, Mass Custom Design, Modern Methods of Construction, Off-Site, Timber Frame, UK

1. INTRODUCTION: 
HOUSING DELIVERY IN THE UK - FROM TRADITIONAL DELIVERY TO OFF-SITE CONSTRUCTION METHODS

In 2006 the BoKlok approach to affordable housing was launched in the UK to great acclaim. As the name suggests, BoKlok literally translated means live smart. The concept was originally created in the 1990s by the joining of IKEA and Skanska in Sweden. The fusion of these two large companies brought together a strong design company that understood the market place and customer needs for affordable housing, and a construction company with over 100 years constructional experience.

BoKlok’s parent company IKEA is an organisation that is strongly orientated towards its market. The products which are designed, produced and delivered to IKEA stores are based on the needs, demands and selection criteria of their customer base. The products sold within the stores are developed from the initial idea to product launch in house involving economic, technical and market driven factors.

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derived from analysis of the companies’ clients and customer base. This approach allows the company to learn from its customers’ needs and buying behaviour and predicting to some extent, the potential needs and requirements that may well occur in the future. This is analysed and structured through use of both the Manufacturer-Active and Customer-Active Paradigm. The Manufacturer-Active paradigm (MAP) and the Customer-Active Paradigm (CAP) were originally defined by Eric von Hippel in 1978. These paradigms explain a structure of opportunities that could be utilised by an organisation that arise from the market the company supply, for generating new ideas with the customers input and feedback from the initial stages of development. Customer feedback can create better market intelligence that can increase market strength in the short term, followed by market predictions in the long term.

Founded in Malmo in 1987, Boklok was formed with the aim of unifying the use of technology to deliver both a system of delivery for mass produced housing whilst retaining the individual need, from the customer perspective, of customisation. The original concept for BoKlok as shown in Figure 1 was a direct response to the market need for low priced housing in Sweden in the mid 1990s. For a period of 10 years prior to the Millennium, there was very limited private housing built even though demand was high. In 1995 the BoKlok concept team was formed and later, in 1997, the initial BoKlok houses were completed (Figure 2). The concept was then extended to other Nordic Countries and in 2006 launched in the UK. The BoKlok house types are known collectively as ‘Generations’ or Gen1 for the apartment type blocks and Gen2 the first BoKlok housing, developed in conjunction with British Architects. The design approach allowed for an open plan flexible living format on one or two floors, with kitchen, dining and wet rooms providing the serviced spaces.

2. THEORETICAL BACKGROUND

The proposed theoretical model for this study has its origins in the automation of fabrication and design. The original model was implemented initially by Duarte and Simondetti (1997). This model was further developed with the intro-
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